Flying Safety

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HIS ISSUE

Flying Safety on the AIRWAYS

RESTRICTED

ACCIDENTS LIMIT OUR AIR POWER

THE success of the United States Air Force Flying Safety Program is a vital factor in the effective and efficient employment of air power. Now, more than ever, the demand exists for stringent application of accident preventive measures.

In view of imposed restrictions on flying time, each Air Force pilot must exercise maximum vigilance in his responsibilities for the safety of his aircraft and crew, and fully utilize available flying time for training purposes. It is imperative that each ground and aircrew member perform his assigned duty with utmost care and precision. Commanders and supervisory personnel must zealously maintain aggressive control, both in the planning and execution of the mission. Only through the concerted efforts of each individual can the desired results be obtained.

The downward trend of Air Force accident rates is most gratifying. It should serve to caution the wary for redoubled effort if this trend is to be continued. Progress toward accident elimination is being accomplished through constant research and development to improve aircraft, equipment and techniques.

Within my command, aircraft accident rate analysis indicates a decrease in an inverse proportion to the frequency of visits and inspection tours to subordinate commands and installations by staff personnel. Flying safety is a preventive rather than a remedial program. Its effectiveness depends upon the thorough integration of safety training into the overall Air Force training program and requires close and constant supervision.

The experience level of Air Force pilots has increased substantially since the rapid mobilization in World War II. The value of air discipline has become more evident to the individual pilot. Each year, however, the constant flow of newly-rated pilots, of experience necessarily limited to that gained in flying school, presents a challenge to our flying safety program. This program must be thoroughly sound for there can be no retrenchment of our efforts to better our procedures systematically.

At times, the nature of our operation involves the assumption of a certain element of risk. The Berlin Airlift was a mission of that nature. Full utilization of aircraft and crews was demanded in this extended, all-weather type operation, with a resultant tremendous accident potential. Actually, the Airlift was accomplished with an exceptionally low accident rate. This flying safety achievement was not a coincidence, but the result of coordinated action at all levels in reducing operational hazards to a minimum.

Flying Safety must essentially be a vital part of operational planning based on the principle that needless waste of manpower and materials can and must be eliminated. Conservation of human and material resources must be recognized as an integral part of a well-planned program. This can be accomplished only through cooperative and individual enthusiasm, sincerity of purpose, and determination on the part of all United States Air Force personnel.

John K. Cannon

JOHN K. CANNON
Lieutenant General, USAF
Commanding U. S. Air Forces in Europe

Flying Safety on the AIRWAYS

AIRWAYS are the highways of the air. An airway is the navigable air above a 10-mile wide strip of the earth's surface between designated points. An airway includes all the air space above the strip. There are certain air space reservations, established by presidential proclamation, that must be detoured. The Administrator of Civil Aeronautics designates airways by naming definite points, such as radio range stations, and extending the center line of the airway through the center of the points specified. Airways are direct routes (as the crow flies) except for bends to take in centers of population.

Domestic IFR traffic in 1949 amounted to more than 10 million fix postings. With so many planes in the air, it is obvious that definite, predetermined flight paths and procedures are vital to safety and efficiency. Airway designation provides flight paths properly identified and equipped with aids to air navigation, wherein all aircraft proceed at fixed altitudes and on planned schedules known to the airway traffic control centers.

Airway procedures are safe procedures. They have been carefully evolved from years of flying experience. Every military pilot should understand and follow them. He owes it to himself, to insure his own safety; but much more than that, he owes it to the government, which has a large investment in him, in the plane he flies, and in the other pilots, crew members, passengers and planes in the air when he is in the air. He can protect this investment by learning how to fly the airways safely and intelligently.

ARTC and You

The assigned mission of Air Route Traffic Control is to expedite the flow of traffic along and across civil airways during all weather conditions, in a manner consistent with safety. The intent of this Flying Safety Magazine Feature, prepared in cooperation with the USAF Instrument Pilot School, Tyndall AFB, Florida, is to clarify points often confused pertaining to airways flying and to show the pilot how he can help ARTC accomplish its mission. All of the information contained herein is found in publications available to pilots. If further study is desired, the following publications may be consulted: "Airmen's Guide;" "The CAA Flight Information Manual;" AN-08-15-1 "Radio Facility Charts;" 08-15-2, 08-15-3, AFR 60-16, and the ANC Manual "Procedures for the Control of Air Traffic."

As ARTC does not in most cases have direct communications with the pilot, CAA communications facilities relay all messages between the ARTC center and the pilot. *In this article when a contact with ARTC is mentioned, it should be understood that the radio contact will normally be made with a CAA communications station.*

The following 14 pages will emphasize that when you're going to fly IFR on the airways, if you:

Find Out About The Weather
File Your Flight Plan
Request Your ARTC Clearances
Follow Correct Takeoff Procedures
Maintain Flight Rules, Altitude and Airspeed
Report Passing Compulsory Radio Fixes
Use Correct Radio Voice Procedures
Obey Landing Sequence Rules
Land as Instructed
File Your Arrival Report

you'll be all right!

In the interest of economy and efficiency, an agreement has been reached with the CAA with regard to certain communications service concerning flight of military aircraft, effective throughout the continental United States on 1 May 1950. CAA stations will receive and transmit to and from military flight service centers, operational clearances and arrival and departure messages filed by military pilots at nonmilitary airports without direct flight service communications.

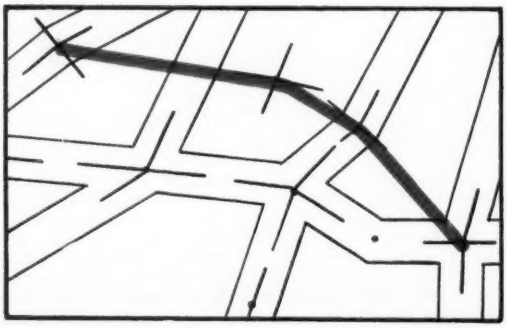
FLIGHT PLANNING

Section "D" of the Form 23 and of NME Form 175 is transmitted to ARTC and is the basis for control of the flight. The information it contains must be correct.

It is important that no misunderstanding exists between the pilot and ARTC concerning the proposed route of flight specified in the flight plan. The route may be adequately described by indicating the color abbreviation and number of the airways to be flown. Civil Airways which cross or merge for short distances with the airway being flown need not be indicated. Intermediate reporting points along an airway need not be indicated; thus "Green 5 to New York" can describe an entire flight from Los Angeles to New York. All alternating portions of VFR or IFR flight along an airway must be accurately described however, and great care must be taken in congested areas to avoid confusion.

A flight plan may be filed which incorporates both airways and direct-off-airways routes, but care must be taken to define clearly an off-airways route. The route of flight shall be indicated by the identification of reporting points over which the flight will pass. To permit accurate plotting of routes by ARTC personnel reporting points should not be more than 200 miles apart. The check points should be such that the position of the aircraft can be accurately determined. Pilots are required to report

Off airways flights must be planned so as to pass over reporting points not more than two hundred miles apart.



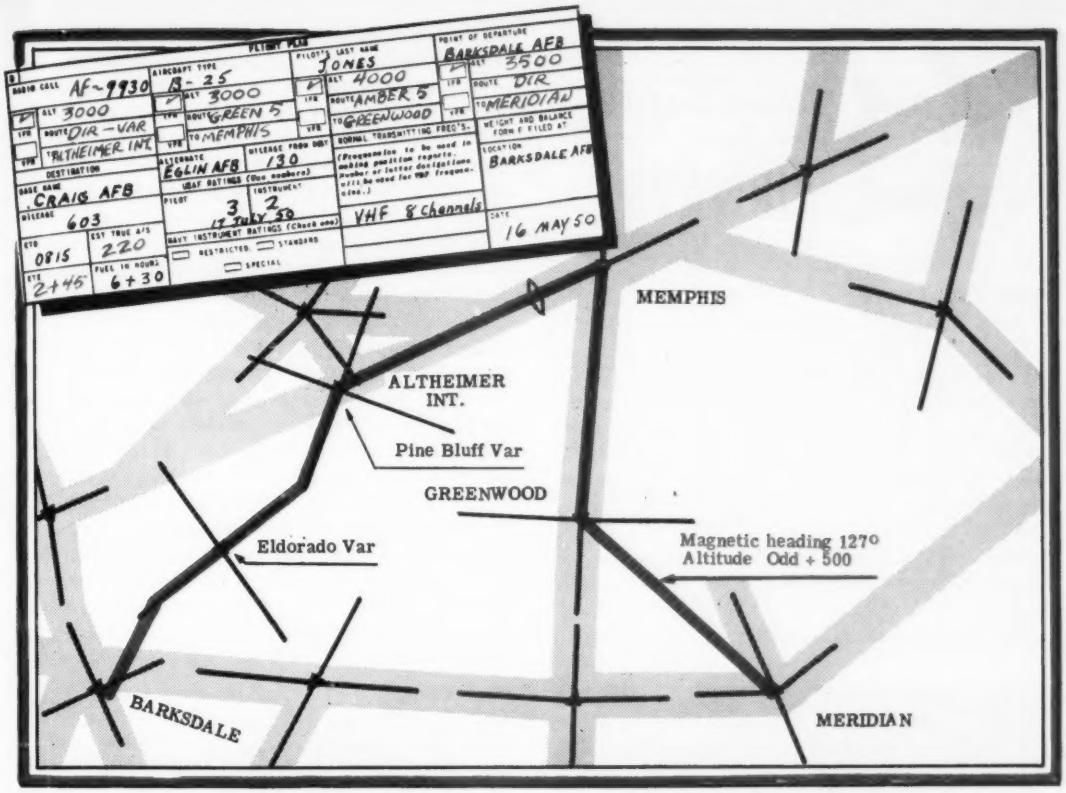
to ARTC the time of passing each check point specified in the flight plan.

If the pilot intends to utilize visual-aural ranges he should so specify in the flight plan. Many VAR ranges have voice facilities and should be utilized for navigational aid and communications services.

Aircraft on IFR flight plans must be flown at not less than the established minimum altitude for the airway over which the flight is conducted. The flight plan should indicate the even or odd thousand foot altitude above sea level that is appropriate for the direction of flight along Civil Airways. When "500 feet on top (5/otp)" is requested *the pilot accepts responsibility for avoiding other aircraft and is expected to fly the altitudes prescribed for VFR flight along civil airways.* These altitudes are not the same as the quadrantal separation altitudes for IFR and VFR off airways flights, especially on southeasterly and northwesterly headings. *It is the direct responsibility of the pilot to avoid other traffic when flying under VFR conditions even if flying on an IFR clearance at an assigned altitude.*

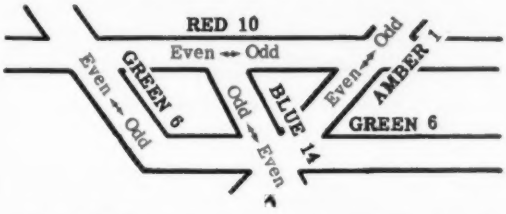
Usually, it is the best policy to file an IFR flight plan if VFR conditions are not assured, but a flight plan can be filed that has both IFR and VFR portions. If the first portion of the flight is IFR and the latter portion VFR the traffic clearance may be obtained only for the first portion if desired. If the latter portion of a flight is IFR the pilot will be instructed to contact a communications station to receive traffic clearance before entering the IFR portion of the flight.

True airspeed is specified and ARTC expects the pilot to make good this airspeed as it is used in computing the longitudinal separation maintained between aircraft flying the same airway at the same altitude. An incident that occurred recently illustrates the danger created by not maintaining the specified TAS. A B-25 pilot who filed and maintained 230 true airspeed was cleared from Pittsburgh to Columbus, Ohio, along Green 4 at 9000 feet. Fifteen minutes later, a B-26 pilot who also filed 230 true airspeed was cleared over the same route at 9000 feet. The B-26 reported over Columbus only one minute later than the B-25 and was apparently flying 230 *indicated airspeed.* All pilots must file TAS and familiarize themselves with the procedure for maintaining this airspeed. *Any deviation of true airspeed in excess of* 10 *MPH constitutes a change in flight plan and ARTC must be informed of the change.* If it becomes apparent during the flight that the original ETE is in error, it is usually easier to file a corrected ETE than to adjust the airspeed to make good the original estimate.



The above flight plan is shown on NME Form 175 which will gradually replace Form 23. The points shown in red are those which cause the greatest misunderstanding between ARTC and the pilot.

Chart of cruising altitudes for VFR flight within Control Areas and Control Zones.



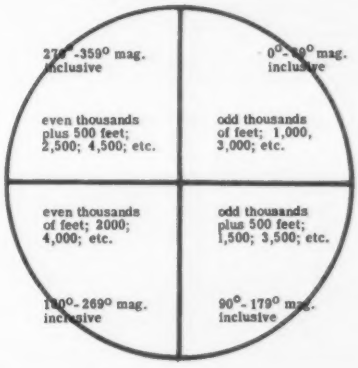
Aircraft flying VFR at or more than 3,000 feet above the surface within control areas and/or zones must be flown at odd or even 1000-foot levels appropriate to the direction of flight.

On *Green and Red Airways eastbound* flights will fly at *odd* thousand foot levels, westbound flights at *even* thousand foot levels.

On *Amber and Blue Airways northbound* flights will fly at *odd* thousand foot levels, southbound flights at *even* thousand foot levels.

NOTE: These rules are the basis for requesting en route altitudes on IFR flight plans. If possible aircraft flying "at least 500 feet on top" (5/otp) should conform to the above altitudes. These rules will apply although flight visibility may be unlimited (VFR flight in control areas and zones requires at least 3 miles forward visibility).

Chart of cruising altitudes outside of control areas and control zones.


270°-359° mag. inclusive
0°-89° mag. inclusive
even thousands plus 500 feet; 2,500; 4,500; etc.
odd thousands of feet; 1,000, 3,000; etc.
even thousands of feet; 2000; 4,000; etc.
odd thousands plus 500 feet; 1,500; 3,500; etc.
180°-269° mag. inclusive
90°-179° mag. inclusive

Civil Air Regulation No. 60.32 requires observance of the above cruising altitudes at or above 3,000 feet above the surface when the flight visibility is less than 3 miles, and No. 60.44 requires observance of these altitudes at all times during IFR operations. These altitudes apply outside of control areas and control zones. It is recommended that pilots conform to the above altitudes regardless of the visibility, particularly in congested areas.

Flying Safety on the AIRWAYS

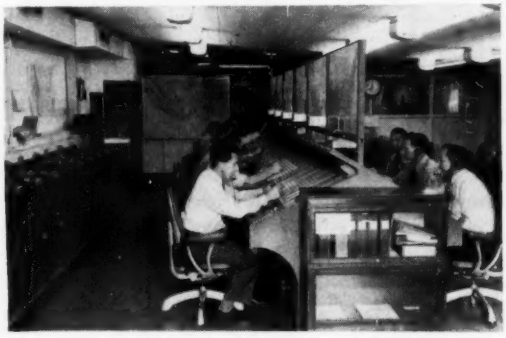
ARTC CLEARANCE

After starting the engines, the tower is requested to obtain the ARTC clearance at the same time taxi instructions are requested. The pilot should be prepared to copy the clearance quickly and accurately, as it must be read back to the tower to eliminate misunderstanding. The best method is to check the clearance against the flight plan on the duplicate copy of the Form 23 and note any variations, or to make a copy of the expected clearance prior to receiving it. It is virtually impossible for anyone to copy a clearance accurately unless it is given very slowly.

Most clearances will include climbing instructions such as "Climb on course," "climb on a heading of 150 degrees," and some clearances may even include the direction of takeoff as, "take off southeast, right turn after takeoff, climb on a heading of 270 degrees, report when reaching 500 on top." Usually, these instructions will be issued by word description, but at several major terminals a system of coded departure routes has been initiated. The pilot should study the possible routes of departure in his flight planning to eliminate delay and confusion after receiving his clearance. Climbing instructons will occasionally specify a somewhat devious route of departure but these routes are the only possible method of expediting arrivals and departures at busy terminals. VFR flight may be specified in climbing instructions, such as "climb VFR" or "maintain VFR for five minutes on a heading of 225 degrees before starting climb."

The initial clearance will normally authorize flight to the point of intended landing but in some cases the clearance will be to some intermediate point due to traffic conditions. In such case, the clearance for the remainder of the flight is usually received before reaching the intermediate point.

Supervisor's desk at ARTC, Los Angeles.



Assistant Controller's panels—these men are the ones who receive your clearance. (Far Left) Dictaphones used in recording all conversations between ground and air.

Controller's panels showing maps of each Controller's sector.

Close-up of Controller's panel.

POSITION REPORTING

The safety of all planes in the air and the effectiveness of ARTC depend on accurate position reporting by pilots. To provide proper separation and to expedite the movement of aircraft, ARTC must be able to make accurate estimates of the progress of every aircraft operating on an IFR flight plan. Unless pilots make all required position reports promptly and accurately, it is difficult for controllers to compute the actual and future position of flights with the result that traffic conflictions cannot always be accurately foreseen. An error of even one minute in position reporting can result in delays, or in separations which is less than the required minimum.

To insure accuracy, the aircraft's clock should be checked before each flight and the time of passing a fix given to the nearest minute. Care should be used to identify the reporting point correctly. When an aural or visual indication is used to determine the time of passing a reporting point such as a fan marker, "z" marker, cone of silence, or the intersection of two range legs, the time should be noted when the signal is first received and again when it ceases. The mean of the two times should be taken as the actual time over the fix. If a position is given as a direction and a distance from a reporting point, the direction and distance should be accurately computed.

Pilots are required to report by radio the time and altitude of passing each designated (compulsory) reporting point en route and to report over any other points when requested to do so by ARTC. When an aircraft is cleared to, or instructed to hold at, a non-compulsory reporting point, a position report must be made when the aircraft arrives at the fix although ARTC may not have requested a report.

All position reports should be preceded by an initial call to establish contact. The last four digits of the aircraft's serial number, preceded by the service designation, (and the word jet, if applicable), should be used for the initial call.

Position reports should be made as soon as possible after passing a fix, but it is not necessary to report when directly over the fix. Before initiating the call the time should be noted, the estimate for the next fix computed, and the radio monitored to avoid breaking in on another conversation. Exact time over the fix is the time given in the report, hence the importance of setting the clock accurately.

Position reports to ARTC stations will consist of the information contained in Illustration A. (*Bold type indicates phraseology*).

All superfluous words are eliminated to save time. The required information should be given in proper sequence. Rapid speech should be avoided, however, to allow the range station operator time to copy the report accurately. The ground station designation, "Washington radio, Shreveport approach control," etc., may be deleted after contact is established. ARTC does not require pilot to name departure point when making a position report. See Illustration B.

The CAA station will receive and file locally VFR position reports received from military pilots in the air and will receive and transmit to military flight service centers in-flight changes which are of operational interest to either flight service or air defense. CAA stations will transmit to military pilots in flight such flight advisories as requested by military flight service.

ILLUSTRATION A

1. ***Identification:*** **Air Force Jet 9890**
   (The last four digits of the aircraft's serial no. preceded by the service designation and jet, if in a jet aircraft.)
2. ***Position:*** **Over Gordonsville**
   Airways fix.
3. ***Time:*** **One Zero Three Seven**
   To be stated in exactly four figures, utilizing the 24-hour clock. Time may be stated in minutes only (two figures) in airport traffic control communications.
4. ***Altitude:*** **At Three Zero Thousand**
   To be given in even hundreds and thousands of feet for numbers of 12,000 and smaller as, "Twelve thousand five hundred". Numbers of 13,000 or over shall be given as for example: "one three thousand."
5. ***Type of Flight Plan:*** **Instrument Flight Plan**
   Not to be abbreviated in the case of IFR. VFR may be given as VFR.
6. ***Departure point:*** **Maxwell to**
7. ***Destination:*** **Andrews**
8. ***Estimate next fix:*** **Doncaster One Zero Four Six**
   This pilot estimated nine minutes Gordonsville to Doncaster. Adding nine to 1037 (his time over Gordonsville) gives an ETA of 1046.
9. ***Remarks:*** **Request expected approach time for GCA approach to Andrews**

ILLUSTRATION B

Aircraft (Initial call):	**Washington radio this is Air Force 0672, over.**
Ground station (reply):	**Air Force 0672, this is Washington radio, over.**
Aircraft (Position report):	**0672 over Washington, six thousand, instrument flight plan Richmond to Philadelphia, Relay 1003, over.**
Ground station (reply):	**72, Washington radio, roger, wait.**

CHANGE OF FLIGHT PLAN

Any change from the original IFR clearance must be approved by ARTC. The pilot may change from IFR to VFR by informing any communications agency that has direct contact with ARTC that he is cancelling his instrument flight plan at a stated time.

Change of destination. Every pilot desiring a change in point of first intended landing will contact a CAA communications station or military communications facility, giving the following informaton for transmission to military flight service: All information required by Section D, AF Form 23, and any other pertinent information requested. (Pilots without clearing authority will change destination only when it is necessary in the interest of safety.)

Change of IFR flight plan or VFR to IFR: Every pilot requiring such a change in flight plan en route will obtain traffic clearance from Air Route Traffic Control, through either military or CAA communications facilities. The facility obtaining the traffic clearance will be responsible for transmitting change to MFS.

When a change of destination and/or route is desired the pilot should make a normal position report followed by the details of the requested change in flight plan, (destination, route requested, altitude, ETE from the present fix to the destination, remaining fuel aboard in hours and minutes, pilot rating and alternate airport). This information should be computed and written down before initiating the call.

The request for a change in altitude, if desired, should be made immediately following a normal position report unless an emergency exists (icing conditions—loss of power, etc.).

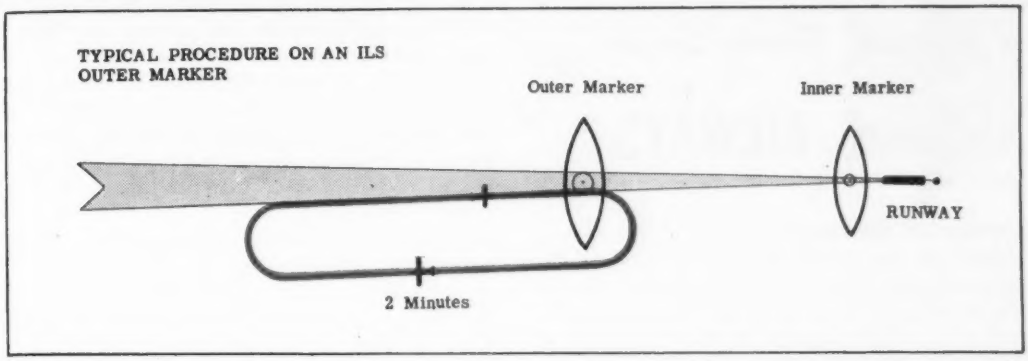
Closing Flight Plan—At locations with an established military base operations, all pilots will close their flight plans with base operations upon landing. At nonmilitary installations, pilots will file an arrival report with the CAA communications facility at point of landing ("P" fields). When landing at fields without communications the nearest CAA station or military radio facility to point of landing will be contacted from the air and flight plan closed.

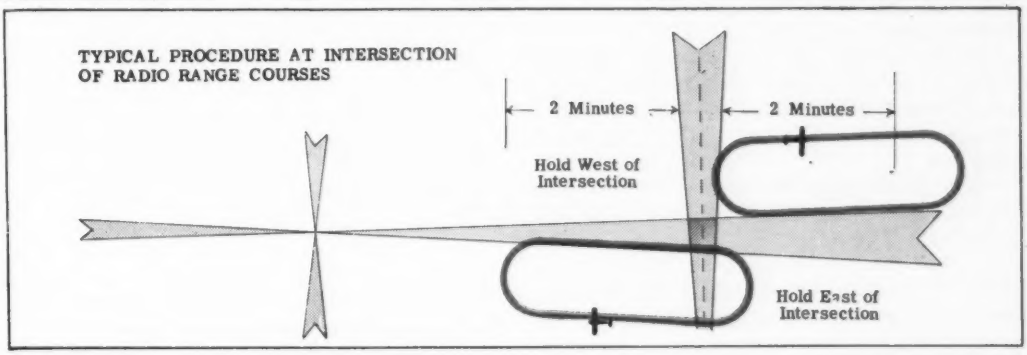
HOLDING

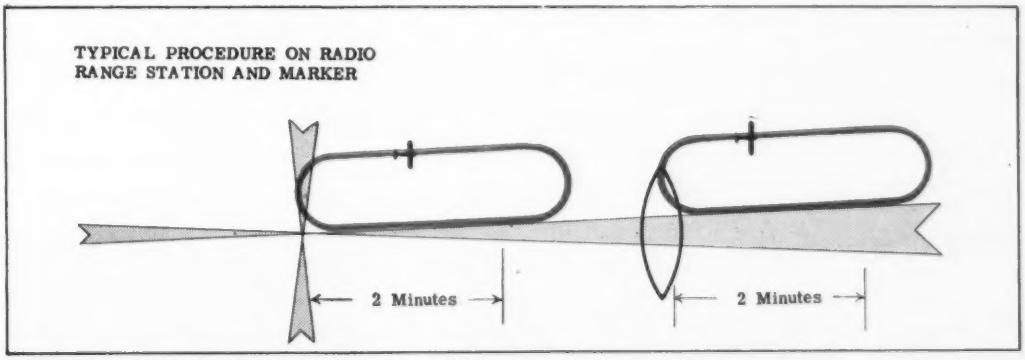
Holding is the flight path made by an aircraft with a definite time, heading, and altitude relationship to a prescribed fix. Some holding is required on nearly all IFR flights. The standard holding flight path is to follow the specified course inbound to the holding fix, make a 180-degree standard rate turn (3 degrees per sec.) to the right, fly a parallel course outbound from the holding fix for two minutes correcting for known drift, turn 180 degrees to the right and again follow the specified course inbound. When holding at an approach control fix and instructions are received specifying the time of departure from the fix, the pilot should adjust his flight path so that *he may leave the holding fix at the specified time.* This is accomplished by shortening or lengthening the legs of the holding pattern as required. A procedure turn need not be executed as the aircraft may proceed to the new fix or to the final approach directly from the holding pattern. All turns required in connection with entry or exit from a holding pattern should be made on the same side of the prescribed course as the pattern.

Due to the location of facilities in congested areas, terrain and other factors, non-standard holding patterns are utilized at some locations. These non-standard holding patterns are depicted in AN 08-15-1, the Radio Facility Charts. The standard holding pattern should be used when instructed to hold at a specified holding unless otherwise specified by ARTC or the approach controller. Whenever a non-standard holding pattern is assigned, the holding instructions will stipulate that the holding pattern is non-standard or holding instructions will be outlined in detail. If a pilot receiving instructions to use a non-standard holding pattern is not familiar with such pattern, he should consult the Radio Facility Charts or request detailed instructions from the traffic controller.

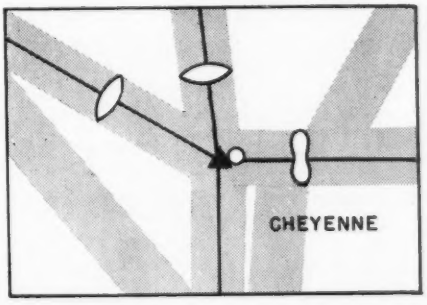
Holding instructions will normally include the expected approach time to allow the pilot to plan a course of action. If a pilot is issued instructions to hold at a point en route and no expected approach clearance time is issued, the holding clearance will contain a time limit, using the phrase "EXPECT FURTHER CLEARANCE AT (TIME)."

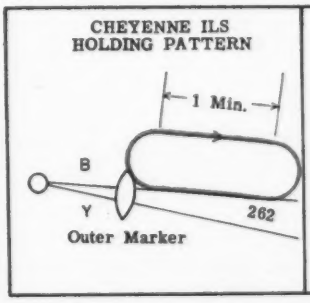


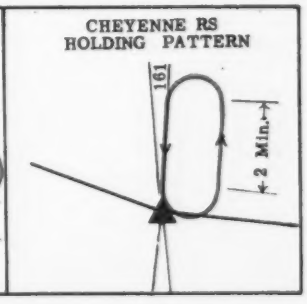




(below) NON-STANDARD HOLDING PATTERN USING CHEYENNE AS AN EXAMPLE







APPROACH CONTROL

Approach control was designed to minimize the communication between local areas and the ARTC control center. This is accomplished by authorizing local CAA or military tower operators to plan and control the approach of aircraft to one or more airports under instrument conditions. Control is maintained by communicating directly with the pilot over the radio range or control tower frequency. The effectiveness of approach control is dependent upon the pilot's knowledge of the proper procedures.

When arriving over the holding fix, the pilot calls approach control on the frequency designated by his ARTC clearance. The time, altitude, and type of approach requested are the only items required in this report. This contact with approach control should not be made before reaching the holding fix unless specifically requested to do so. The pilot will initiate and make a report thereafter when:

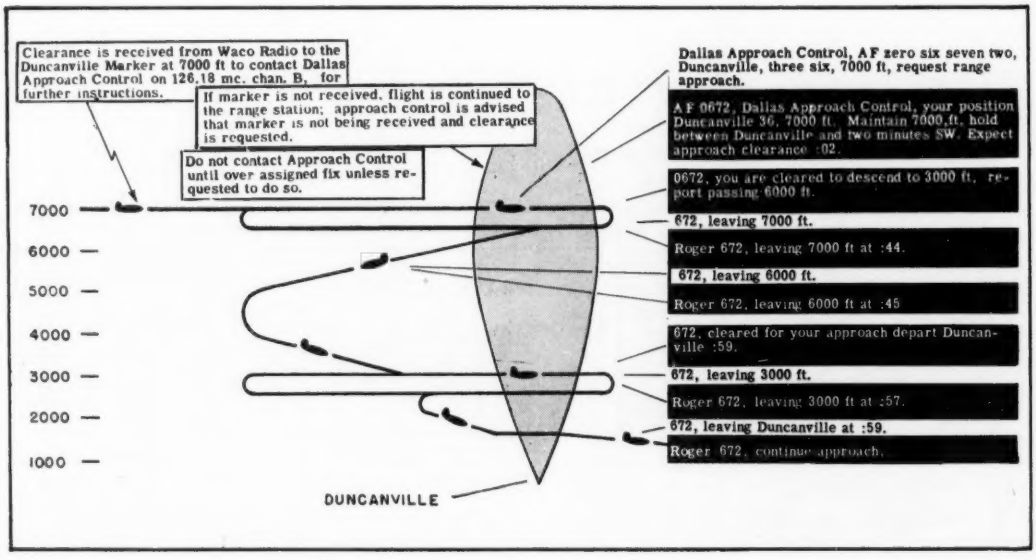
1. Leaving or reaching an approach control holding point.
2. Leaving a previously assigned altitude.
3. Arriving at a newly assigned altitude.
4. An approach has been missed and further instructions or clearance are required.

The pilot may cancel his IFR flight plan at any time by requesting cancellation from approach control. VFR conditions should be definitely assured, however, before canceling. Any other information desired by the approach controller will be requested from the pilot.

The standard elliptical holding pattern is used unless otherwise instructed by the approach controller. Non-standard patterns are shown on the appropriate page of the Radio Facility Charts and should be studied before arriving at the fix. Each pilot holding in an approach sequence will be given advance notice as to the time he should leave holding marker inbound and the holding pattern should be adjusted so that he will be in position to leave the holding fix at the designated time. Aircraft arriving over the point from which approaches are commenced will normally be cleared in the order of their estimated arrivals over the point.

When clearing into an approach control area the pilot should:

1. Familiarize himself with the procedures in effect for the area and make full utilization of the facilities available for approach control.
2. Maintain a continuous listening watch on the approach control frequency.
3. Adhere closely to approach control instructions.
4. Make required reports promptly and concisely.


Clearance is received from Waco Radio to the Duncanville Marker at 7000 ft to contact Dallas Approach Control on 126.18 mc. chan. B, for further instructions.
If marker is not received, flight is continued to the range station; approach control is advised that marker is not being received and clearance is requested.
Do not contact Approach Control until over assigned fix unless requested to do so.
7000
6000
5000
4000
3000
2000
1000
DUNCANVILLE
Dallas Approach Control, AF zero six seven two, Duncanville, three six, 7000 ft, request range approach.
AF 0672, Dallas Approach Control, your position Duncanville 36, 7000 ft. Maintain 7000 ft. hold between Duncanville and two minutes SW. Expect approach clearance :02.
0672, you are cleared to descend to 3000 ft, report passing 6000 ft.
672, leaving 7000 ft.
Roger 672, leaving 7000 ft at :44.
672, leaving 6000 ft.
Roger 672, leaving 6000 ft at :45
672, cleared for your approach depart Duncanville :59.
672, leaving 3000 ft.
Roger 672, leaving 3000 ft at :57.
672, leaving Duncanville at :59.
Roger 672, continue approach.

APPROACH CLEARANCE

There are several types of approach clearances issued by ARTC; each should be clearly understood by the pilot so that he may carry out the instructions properly.

An aircraft approaching its destination or holding on the final approach leg of the radio range may be cleared for a *"STRAIGHT-IN APPROACH"* if there is an established straight-in approach procedure.

If traffic permits, an aircraft may be *"CLEARED TO THE TOWER."* No further contacts are required after acknowledging the instructions and the pilot may change to the tower frequency. The approach may be made in any approved manner.

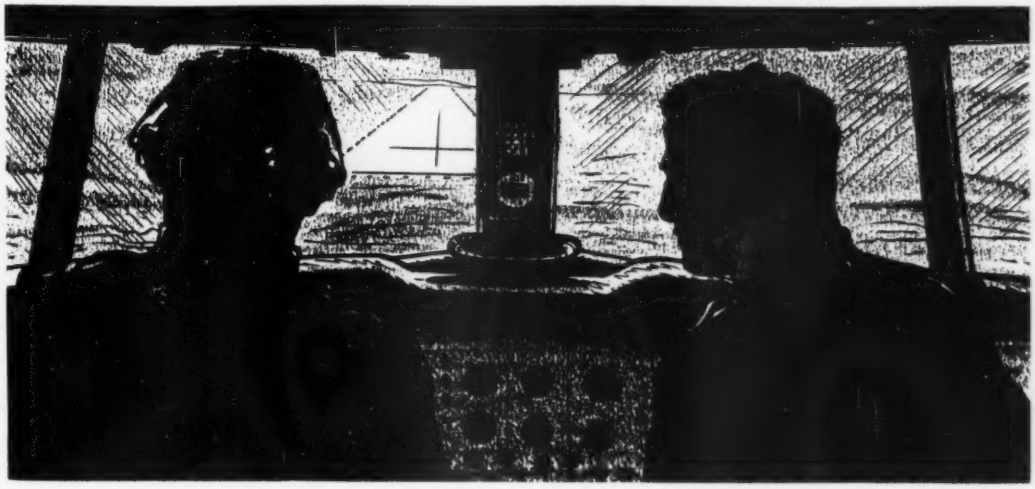
An aircraft cleared to make a *"STANDARD RANGE APPROACH"* shall cross the range station at the approved initial approach altitude, proceed out the approach course of the radio range for a specified number of miles not to exceed the maximum distance authorized in T.O. 08-15-3 and PHACUS, make procedure turn, and descend to cross the range station at the approved final approach altitude. Descent will then be made to the minimum altitude and if in the pilot's opinion it is safe to land, a landing may be made. If visual reference to the ground or water is established before completion of the approach procedure, the entire procedure must nevertheless be executed unless the pilot requests and is granted clearance to proceed to the airport.

Range approach clearances will usually contain instructions to report at specified points during the approach such as: "Report leaving..... thousand feet, report passing through..... thousand feet, report starting procedure turn, report when below all clouds." The approach controller may request any or all of these reports to expedite clearance of the next aircraft in the approach sequence. Pilots should make these reports promptly and accurately. When traffic is heavy, it will help ARTC or approach control if pilots cancel their IFR flight plan immediately when they are able to proceed VFR.

If the pilot is unable to land, he should proceed in accordance with the established missed-approach procedure or as directed by ARTC. The pilot should notify the clearing agency immediately if an approach has been missed.

Pilots are requested to give advance information to ARTC when planning to make an ILS or GCA approach, upon reaching the reporting point preceding the holding fix at the destination airport. This will permit assignment to the proper holding pattern and eliminate unnecessary delays in landing. Failure to use this procedure will not preclude the pilot's right to request an ILS or GCA approach after reaching the holding fix if weather conditions or other factors make such a request advisable. The pilot should also specify an ILS or GCA approach when first contacting the destination radio station or approach control. The controlling agency will obtain the GCA frequency and direct the pilot to the proper position for making the contact with GCA. An ILS clearance will be issued in the same general form as the radio range approach clearance.

Approaches should be completed in the minimum time consistent with safety. A clear understanding of the layout and procedure to be used for the instrument approach will aid the pilot in making a safe accurate approach.



EMERGENCY PROCEDURES

Emergencies and the circumstances surrounding them are so varied that exact rules to be followed in all cases cannot be established. If possible, the procedures outlined in this article should be followed, but the pilot should always use his own judgment if an alternate course of action seems advisable.

In the event of radio failure, either transmitter, receiver or both; or inability to receive radio signals due to static, the pilot should follow one of the following procedures:

1. If operating under VFR conditions proceed VFR and land as soon as possible.

2. Proceed according to the latest ARTC clearance.

If the pilot proceeds IFR according to the last received and acknowledged traffic clearance and other instructions to the contrary are not received and acknowledged, he will be expected to observe the following rules and the procedure followed by ARTC is based on the assumption that he is following these rules.

1. If the pilot has received and acknowledged a clearance to the destination airport or the radio facility serving that point, he will continue flight at the altitude(s) last assigned by ARTC, or the minimum instrument altitude, whichever is the higher, to the radio facility servicing the destination airport.

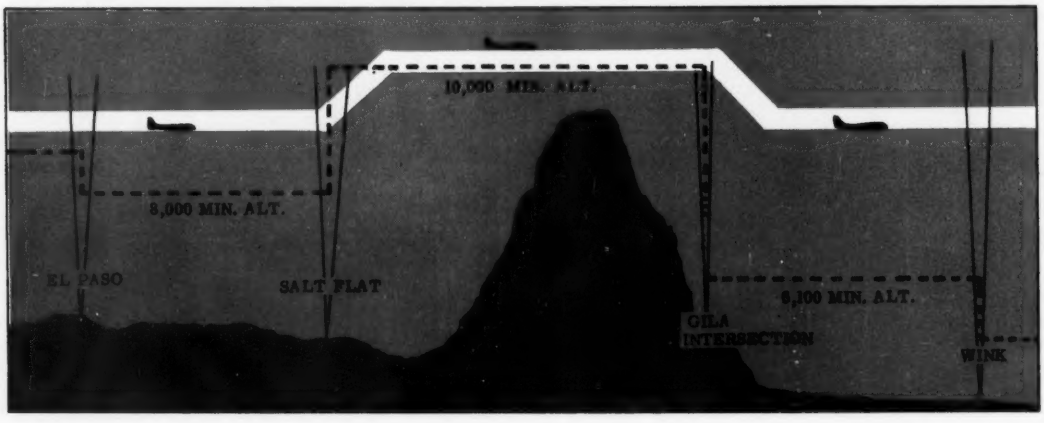
2. If the pilot has received and acknowledged a clearance to a point other than the destination airport or the radio facility serving the destination airport, he will continue flight at the altitude(s) last assigned by ARTC or the minimum instrument altitude, whichever is the higher, to the radio facility serving the destination airport.

3. If holding instructions have been received, the pilot will comply with these instructions until such time as it will be necessary to continue flight so as to arrive at the radio facility serving the destination airport at the expected approach time last received and acknowledged, maintaining the last assigned altitude or the minimum instrument altitude, whichever is the higher.

4. If holding instructions have been received, but no expected approach time has been received, the pilot will comply with these instructions until the time ARTC has specified that further clearance may be expected. He will then continue, maintaining the last assigned altitude or the minimum instrument altitude, whichever is the higher.

NOTE: *The minimum instrument altitude referred to is the minimum established for that portion of the route over which the operation is conducted, regardless of the direction of flight. If deviation from the altitude assigned by ARTC is necessary in order to comply with a higher minimum instrument altitude, any subsequent descent required in order to comply with a lower minimum instrument altitude should not be made below the altitude last assigned by ARTC.*

An aircraft, cleared through El Paso to Fort Worth to cruise and maintain 9000 feet until further advised, loses his transmitter before reaching El Paso. Proceeding on course he maintains 9000 feet until reaching Salt Flat where he climbs to 10,000 feet (the minimum altitude). After reaching the Gila intersection, he immediately descends to the original clearance altitude of 9000 ft.



ALTIMETER SETTINGS

Civil Air Regulations prescribe that flight altitudes shall be in feet above sea level. Accordingly, altimeters should be set to the current setting of the nearest station reporting official altimeter setting along the route of flight. All sea level altitudes used in connection with the control of air traffic are based on the indicated altitude, since any temperature error will affect all altimeters in the same vicinity and relative separation between aircraft will be approximately maintained. Pilots should consider temperature error only with respect to insuring that actual altitude of the aircraft permits ample clearance of terrain and obstructions.

Descent from the altitude maintained to the radio facility serving the destination airport should be made on the final approach course and should start at the expected approach time last received. If no expected approach time was received, descent should be started on the expiration of the ETE or the last estimated arrival time specified by the pilot, or as soon as possible thereafter. A full standard instrument approach should be executed unless a VFR approach can be made. ARTC will hold all altitudes below the clearance altitude open, at the destination radio facility, for any unreported aircraft until 30 minutes after the last expected approach time acknowledged by the pilot, the pilot's ETE or last estimated arrival time, or the estimated time of arrival computed by ARTC, whichever is later.

If a clearance to the tower at the airport of intended landing has been received and acknowledged, he will be expected to comply with any special instructions contained in the clearance and make normal descent for landing.

NOTE: *ARTC may issue appropriate instructions to be broadcast "blind" over suitable radio range facilities. Instructions must not be broadcast unless ARTC authorizes such broadcast.*

Upon receipt of advice that an aircraft in flight within a control area or control zone has encountered an emergency which may affect other air traffic, ARTC will act to give the aircraft encountering the emergency priority over any other aircraft involved.

Should it become necessary for an aircraft holding to make an emergency descent for a landing through other traffic, the pilot of that aircraft should so advise ARTC through appropriate communications facilities.

Upon receipt of advice that an aircraft is making an emergency descent through traffic at assigned altitudes over the airport, ARTC will immediately broadcast, or cause to be broadcast, on radio range frequency the following:

EMERGENCY TO ALL CONCERNED
EMERGENCY LANDING AT.....AIRPORT
ALL AIRCRAFT BELOW.....THOUSAND FEET
WITHIN.....MILES OF.....RADIO RANGE
LEAVE.....COURSE(S) IMMEDIATELY

Upon receipt of such a broadcast, pilots of aircraft affected should clear specified areas in accordance with the emergency instructions. ARTC will issue further directions through appropriate communications facilities immediately following the emergency broadcast. When terrain, traffic, or other factors make it impractical for an aircraft to maintain the last assigned altitude, ARTC will issue specific directions to such aircraft.

When all radio navigational equipment is inoperative the aircraft should climb to and maintain the emergency altitude for the surrounding area. DR navigation should be used to reach a region where a VFR letdown can be made.

In an emergency situation which results in a deviation from the rules prescribed in Civil Air Regulations, Part 60, the pilot should make an immediate report to the nearest CAA regional office. When the emergency situation results in no deviation from C.A.R. 60, but requires ARTC to give priority to the aircraft, the pilot of such aircraft should make a report to the nearest CAA regional office within 48 hours. Compliance with this does not eliminate the pilot's responsibility to notify his commanding officer within 24 hours of a violation in accordance with AF Reg. 60-16, Par. 48.

EVER BEEN LOST?

Personnel at CAA communications stations are trained to assist pilots in establishing position by:

(a) Visual reference to terrain features.

(b) VHF omni-range indications (triangulation).

(c) Low frequency radio range orientation.

WEATHER BROADCASTS

All continuously operated CAA radio range and radio beacon stations having voice facilities on the range or radio beacon frequencies broadcast weather reports and airway information at 15 and 45 minutes past each hour. The 15-minutes-past-the-hour broadcast is an "airway" broadcast consisting of weather reports from important terminals located within approximately 400 miles of the station. The 45-minutes-past-the-hour broadcast is an "area" broadcast consisting of weather reports from locations within the flight information area of the station.

The broadcast consists of the local weather report and the latest available surface reports from other locations. Reports more than one hour old are not broadcast. Local winds aloft are broadcast four times daily after the broadcasts at 0615, 1215, 1815, and 0015. The velocities of winds aloft are broadcast in *knots*—not miles per hour. At selected stations the Weather Bureau provides a local terminal forecast covering the next two hours. This forecast is broadcast, when available, immediately following the local weather report.

Pilots enroute are requested to avoid, if possible, calling airway communications stations at or about 15 and 45 minutes past the hour (which are the scheduled broadcast times) to request weather information, as such calls may delay starting of scheduled broadcasts and cause inconvenience to other persons who are depending on the broadcasts for weather reports.

The pilot of an aircraft encountering weather conditions which have not been forecast should report these conditions to ARTC. Report in this sequence:

1. Cloud amount (in tenths); cloud form (cumuliform or stratiform); cloud heights (tops and bases).
2. Precipitation, type and intensity.
3. Thunderstorm activity and intensity.
4. Icing, type and altitude.
5. Turbulence, if severe.
6. Temperature.
7. Any unusual or hazardous weather.

The reporting of unanticipated weather en route, such as icing or extreme turbulence, may be importance to the safety of other aircraft anticipating flight within the area.

VISIT AN ARTC CENTER

The personnel of ARTC will be glad to discuss any further questions with pilots who visit one of the centers. The location of the centers which can be easily reached from Air Force bases are shown below:

Denver Air Route Traffic Control Center
Municipal Airport, Denver, Colorado
El Paso Air Route Traffic Control Center
El Paso, Texas
Fort Worth Air Route Traffice Control Center
Majestic Building, 1101-1107 Commerce Street,
Fort Worth, Texas
Great Falls Air Route Traffic Control Center
Municipal Airport, Great Falls, Montana
Minneapolis Air Route Traffic Control Center
Wold-Chamberlain Airport, Minneapolis 19,
Minnesota
New York Air Route Traffic Control Center
LaGuardia Field, New York
Salt Lake City Air Route Traffic Control Center
Municipal Airport, Salt Lake City, Utah
San Antonio Air Route Traffic Control Center
409 Bedell Building, San Antonio, Texas
Washington Air Route Traffic Control Center
Washington National Airport, Washington, D.C.

ARTC Centers are also located in the following cities:

Albuquerque, New Mexico
Atlanta, Georgia
Boston, Massachusetts
Chicago 38, Illinois
Cincinnati 2, Ohio
Cleveland 11, Ohio
Inkster, Michigan
Jacksonville, Florida
Kansas City 6, Missouri
Los Angeles 45, California.
Memphis 4, Tennessee
Miami Springs, Florida
New Orleans 7, Louisiana
Oakland, California
Pittsburgh, Pennsylvania
San Purce, Puerto Rico
Seattle, Washington
St. Louis 21, Missouri
Anchorage, Alaska
Fairbanks, Alaska
Honolulu 12, T. H.

P.S. DON'T FORGET TO CLOSE YOUR FLIGHT PLAN

Jet LETDOWN

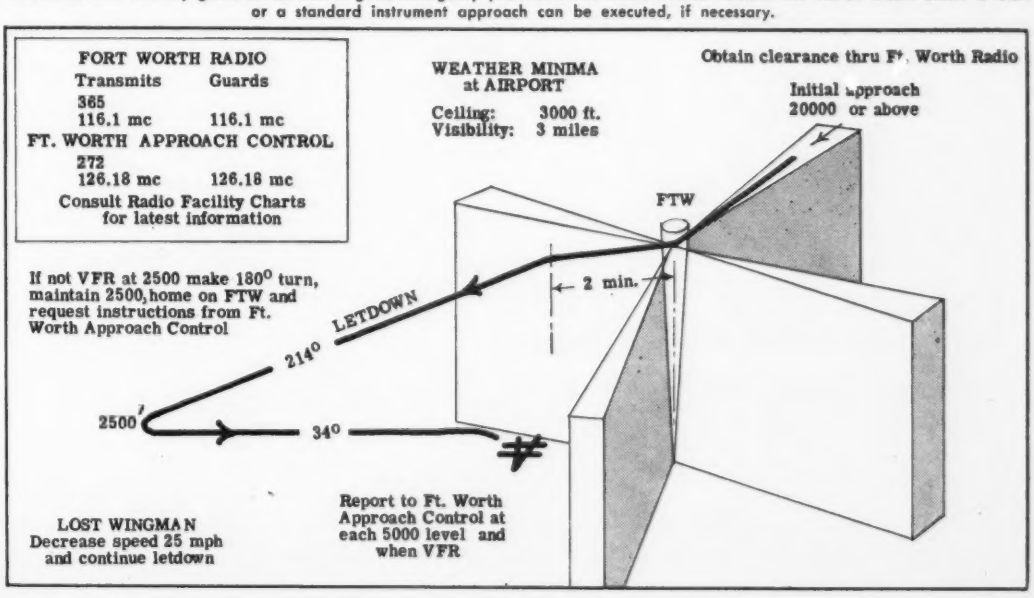
PILOT's handbook "Special Jet-US" was published by the USAF in July, 1949, on an experimental status. It authorized jet letdown procedures which were entirely different from the standard procedure published in T.O. 08-15-3 and PHACUS. In December 1949, it was decided to place these procedures on unlimited status for all units operating jet aircraft. In answer to numerous questions as to the exact use and limitations of this procedure, the following information is furnished:

The jet instrument letdown procedure was designed to permit jet aircraft to let down during IFR conditions from altitudes of approximately 20,000 feet on a radio range while conventional aircraft are holding on the range, provided the weather is as good or better than the minimum altitude authorized for the procedure concerned. These procedures have been coordinated with the Regional CAA office having control over the area concerned.

This procedure has been designed to provide a minimum delay between the time the jet aircraft requests letdown instructions and the actual landing of the aircraft. Proper planning by the pilot is essential. An average airspeed of 300 mph and a rate of descent of 3000 feet per minute were chosen for pictorial presentation of the procedures in the handbook. Use of this airspeed and rate of descent should keep the aircraft within 35 to 40 miles of the range station if making letdown outbound from station. These figures of airspeed and descent are intended for use only as a guide, from which deviations may be made as type of aircraft and circumstances require, within prescribed limits.

A time-distance table similar to the one published in T.O. 08-15-3 is being published in the Jet Manual showing airspeeds from 180 to 400 mph and distances from five to 70 miles. When the jet pilot requests permission to make a jet letdown, it should be necessary to state only "This is Jet Aircraft Number.....(position.....and altitude .....) requesting permission for a jet letdown at.....(base concerned)." Air Route Traffic Control should reply, "Jet aircraft is clear to execute jet letdown procedure." In some cases, ATC will give the heading for and maximum letdown distance from range station for the jet procedure. When this jet letdown procedure is used, the minimum ceiling and visibility published in the Jet Letdown Manual will apply. If a lower minimum is required, stanlard procedures given in T.O. 08-15-3 and PHACUS will be followed, and the minimum altitude and visibility authorized will be the same as that for conventional type aircraft.

The jet instrument letdown procedure for Carswell Air Force Base, Fort Worth, Texas, is considered to be an ideal procedure. The jet aircraft lets down on a heading away from the station, and when minimum altitude is reached a 180° turn is executed. The aircraft homes on Fort Worth radio and if visual ground contact is not established, pilot continues inbound and requests further instructions. This not only gives the aircraft a good emergency procedure but heads aircraft toward the station where either a GCA or a standard instrument approach can be executed, if necessary.


FORT WORTH RADIO
Transmits Guards
365
116.1 mc 116.1 mc
FT. WORTH APPROACH CONTROL
272
126.18 mc 126.18 mc
Consult Radio Facility Charts for latest information
WEATHER MINIMA at AIRPORT
Ceiling: 3000 ft.
Visibility: 3 miles
Obtain clearance thru Ft. Worth Radio
Initial approach 20000 or above
FTW
2 min.
If not VFR at 2500 make 180° turn, maintain 2500, home on FTW and request instructions from Ft. Worth Approach Control
LETDOWN
214°
2500'
340°
LOST WINGMAN
Decrease speed 25 mph and continue letdown
Report to Ft. Worth Approach Control at each 5000 level and when VFR

LACK OF INSTR

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ACCIDENTS caused by an apparent lack of instrument flying proficiency on the part of Air Force pilots take a heavy toll of lives and airplanes.

Fifty-six aircraft accidents during 1947 and 1948 resulted from collisions with the ground which involved weather and personnel error as contributing cause factors. These resulted in collisions with mountains, hills, or level terrain while pilots were flying on actual instruments or attempting to maintain visual flight below prescribed minimum safe altitudes. Of the 56 accidents 48 were fatal, resulting in death to 213, major injury to 47 and minor injury to 30 persons. Sixteen persons escaped without injury. All 56 aircraft involved were destroyed.

In 10 cases pilots flew into hills or mountains while attempting to remain contact below low clouds. In 15 cases pilots lost control while on instruments. Of these, three occurred when the pilots entered thunderstorms on VFR clearances, and lost control in severe turbulence. Eight accidents were attributed to improper letdown procedures because the pilots made their procedure turns too far out from the radio range stations or continued their approaches below prescribed minimum altitudes. The 10 accidents pictured here occurred during a three-month period in 1949 and are not included in the 56 accidents described above.

HOW TO HAVE AN ACCIDENT

—Be a flight leader who zigzags in and out of holes in the clouds trying to stay VFR, get lost and then continue flying into weather turning progressively worse. Run into heavy rain and lose your wingman in a turn. He will then be able to demonstrate his dependency upon you by flying into a tree and disintegrating with his plane. (Pix No. 1)

Or, your wingman may run out of fuel, flying close formation while you wander around trying to stay contact. In that case, he can bail out. (No. 2)

Sometimes a wingman isn't skilled enough to make a quick transition to instruments if you lose him in a turn in a storm. When he strikes the ground in a steep dive, his plane could dig a new water hole. But the cattle might not like water tainted with JP-1 fuel. (Pix No. 3)

—Be a pilot who doesn't check the weather en route. Then, when you meet unexpected thunderstorms, in a plane with the gyro horizon out, or with yourself rusty on instruments, you can have the fun of hedgehopping around constantly lowering clouds until you run out of fuel and crash. (Pix No. 4)

Or fly into a severe thunderstorm, lose control and bail out. (Pix No. 5)

NT PROFICIENCY

—Cancel an IFR flight plan without really knowing your position. Fly all over the countryside looking for the airport, but don't rack your brain by attempting a radio range orientation. Run out of gas and bail out. (Pix No. 6)

—File a clearance to a field with weather below minimums. Take off in a plane with insufficient fuel for such an IFR flight. Spend two hours on range orientation and missed approaches at an airport along your route. Finally, ask someone if they know where there is some VFR weather. Fly in that direction, break out of the soup about the time your fuel warning signal blinks and set the plane down in a truck garden. An Air Force truck will haul it away. (Pix No. 7)

—Be eager to land, even if the base has fogged in below minimums. Don't heed advisories telling you to go to your alternate. Come in low over the field, keeping under the ceiling. Make a turn steep enough to hook the ground with your wingtip. It will all be over in a flash. (Pix No. 8)

—When turbulence and static bother you, go ahead and let down without radio aids and without asking permission. If you break out of the overcast before you hit the ground or a mountain, perhaps you can find a stretch of smooth prairie and land wheels-up. (Pix No. 9)

—Ignore a change of altitude when ARTC wants you to fly higher to clear mountains along your route. By continuing at a lower altitude which you like better, you can knock down some trees just like a bulldozer. (Pix No. 10)

TO PREVENT ACCIDENTS

All Air Force Pilots Should:

Learn approved instrument flying techniques then maintain proficiency through constant practice.

Assure themselves of safe lateral and vertical clearance at all times while flying on instruments.

Obtain and adhere to proper IFR or VFR clearances.

Not descend on instruments unless positive of position.

Not descend below prescribed minimum safe altitudes to remain or become contact.

Fly airways on instruments when possible.

Supervisory Personnel Should:

Require pilots to present instrument cards before they are cleared for instrument flights.

Encourage IFR flights when weather is marginal.

Assure that pilots in their organizations receive proper instrument instruction and maintain maximum instrument proficiency.

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Notes on G.C.A.

WITH a competent pilot in the cockpit and capable, conscientious operators in the trailer, GCA has made safe landings possible, time after time, under zero-zero conditions.

For example, a "souped-in" airfield means just another day's work to the GCA crews of Elmendorf Air Force Base, Alaska. Through fog and snow, 149 aircraft, ranging from Jet F-80s to B-29s, were guided safely to the runway by the Elmendorf GCA last December. This total eclipsed the previous record of 63 foul-weather landings made during the month of November, 1949.

Recently, a C-54, piloted by 1st Lt. Thomas E. Cornell, en route to Alaska from Great Falls, Montana, called for an emergency GCA landing. The number one engine was out and engines three and four began to run rough. GCA took over, clearing all traffic so that the way would be clear for the endangered C-54. The "extra eyes and ears" knew that the first approach must be good, as the transport, loaded with passengers and cargo, was rapidly losing its power. Then, too, the aircraft encountered heavy turbulence and severe icing. In a matter of minutes, the huge plane landed safely—thanks to the pilot's skill and the calm, steady voice of GCA.

Similar stories of GCA "saves" could be told about various units throughout the Air Force. Yet it is important for pilots and operators to know of GCA limitations—ceiling minimums for various fields—and hazardous conditions which might develop. GCA is not a blind instrument landing system, but an approach aid. The pilot who continues below GCA minimums does so at his own discretion. Following are three incidents with lessons of general interest:

The first is told by a pilot.

"Conditions were ideal for a GCA approach at a ZI base. We were flying a C-47, using a hundred-mile-per-hour approach speed, with a 7000-foot runway, and no wind. After rolling out on final, we were still on top, as the solid deck below us was ground fog. At about a quarter mile from touchdown, a check on the altimeter indicated that we might be a little low, considering distance out, but my confidence in GCA was unshaken. Had we been flying an erratic glide path, I wouldn't have hesitated to go around, but we were getting very precise azimuth correction and nothing to indicate that anything was wrong; hence, the decision to continue. About that time, we saw the green boundary lights and touched down a split second later, approximately 100 feet short of the runway, still descending 400 feet per minute. As might be expected, a C-47 bounces under these circumstances, and although I still had a 7000-foot runway left and could have made another flareout, I gave it the throttle and went around.

"Slightly shocked and greatly surprised, I asked GCA what the trouble was and told them their glide path was 100 feet low. When they insisted that it was quite normal, I turned down a second approach and proceeded to a new destination.

"The next morning we came back in VFR and I went down to have a little session with the GCA people. After we talked things over, we came to several interesting conclusions. In the first place, we touched down about 1100 feet short of the normal touchdown point, and yet were supposedly on the glide path the entire time. The scopes were checked and rechecked, yet nothing was found wrong mechanically. The GCA crew demonstrated for us that there is a technique to tracking the pip on the scopes. "The pip is 'tracked' on the scope down a plastic cursor about an inch wide. Edge

lighting of the cursor illuminates a scored line down the center of the cursor and the two edges. Occasionally, the elevation operator 'tracked' the pip on the outer edge line instead of the center line of the cursor."

To prevent this error, AACS has modified the cursors by scalloping the outside edges. This should avoid a situation such as was experienced by this C-47 pilot.

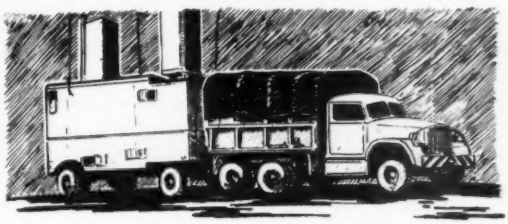
The second contribution comes from a GCA Operator:

"Remember the axiom 'Silence is Golden'? Well, the time all pilots should apply this rule is on the GCA final approach.

"We have the case of the pilot who is a real buddy and is going to do his utmost to help the

fellows in the GCA unit downstairs. Our pilot friend does a swell job around the traffic pattern, just as the search controller specifies; he repeats all headings and altitudes as given and "rogers" all other transmissions. Then, along comes the final approach. The final controller now changes instructions to, "do not answer any further transmissions." Usually, the final controller then goes right on with the approach instructions. The pilot, in his eagerness to fulfill his part of the overall GCA letdown, loses sight of having been told not to answer further instructions and the GCA final goes something like this:

"Now turn right heading 325, maintain 1200 feet altitude' (this from GCA). 'Roger GCA, turning right heading 325, maintaining 1200 feet' (from the pilot). The difficulty that arises here is that the GCA final controller does not hear the pilot respond, is not expecting a response, and so goes on with another transmission simultaneously with the pilot's response to the first communication from GCA. The end result is that the pilot does not hear this second communication from GCA. This is because VHF equipment on the ground and in the aircraft is so designed that the receiver section is inoperative during the time that transmissions are being made. Since the final controller is transmitting continuously, no one in the GCA unit can hear transmissions given by the pilot on the final approach frequency.



"Another serious hazard is created during periods of IFR weather, when pilots start transmitting on any of the GCA primary frequencies without first listening for at least 15 seconds. An example is the case of a pilot who held a lengthy gabfest on channel "H" while GCA was working an IFR approach on that same frequency. The pilot of the GCA aircraft heard only jumbled talk. Being close to the touchdown point (weather down to 100 feet and 1/16 mile), he was left no alternative but to go around."

The need for positive identification of aircraft being worked by GCA is apparent in the following report:

A tragedy was narrowly averted recently when a copilot on a C-121 pulled the control yoke backwards upon seeing trees during a GCA approach.

The Connie had been directed to report to GCA over a marker beacon outbound from the field, at 2500 feet. The Connie pilot checked over the control point, called GCA, and was instructed to make his procedure turn and again contact GCA over the marker at 1500 feet inbound. At approximately the time the Connie was due to report to GCA inbound, another plane appeared on the scope at approximately 2500 feet altitude inbound.

GCA called the Connie, and the pilot who had been using his automatic direction finder, verified his position as over the outer marker inbound. GCA informed the Connie pilot that he was much too high and if he did not want to make another approach, he had better descend more rapidly. Several times the Connie received these instructions from the GCA and was finally told to turn to a heading of 150 degrees and pull up. The Connie pilot told GCA that he was pulling up and that he had almost flown into some trees.

The plane which GCA had actually been tracking did not alter his altitude because he obviously was not tuned to GCA, and ran off the top of the elevation scope slightly over six miles from the base. The search scope then picked up the Connie in the vicinity of the outer marker beacon on a heading of 150 degrees. The Connie was then controlled by GCA to a safe landing.

On examination of the aircraft, a number of

small limbs and leaves were hanging in the landing gear and on the horizontal stabilizer. This near accident was caused by failure on the part of the aircraft crew to identify their position positively and on the part of GCA operators by not requiring more positive identification of the aircraft when the aircraft they were tracking seemed to ignore the instructions being issued. The GCA was tracking one aircraft and issuing instructions to another which was not visible on their final approach scope.

GCA has contributed greatly to safe flight during all types of weather. Improvements in the equipment and operating technique are continuous, assuring that as pilots and operators gain proficiency, even better records will be established.

Lucky Major John Prodgers is congratulated by two lovely ladies upon the completion of his flight marking one accident-free year of operations.

CHAIRBORNE pilots can be good, and it has just been proved to the satisfaction of every rated officer, radio operator, mechanic, line chief, flight chief and clerk assigned to the Far East Air Materiel Command; for on February 11, 1950, this Command completed one year of flying without a major accident. During this time, a total of 19,714 aircraft hours were flown.

The Far East Air Materiel Command, more popularly known as FEAMCOM, is located approximately 30 miles west of Tokyo close to the shadow of majestic Mt. Fuji, its snow-capped peak a familiar landmark to all pilots flying in Japan. FEAMCOM, under the command of Brig. Gen. John P. Doyle, has the mission of furnishing logistical support to all Air Force units in the Far East Air Forces. To accomplish this huge supply and maintenance mission requires the saddling of 114 of 116 rated officers to "mahogany bombers," and enables them to get in a monthly average of 10 to 15 hours flying time.

Until 30 June 1949, the Marianas Air Materiel Area located at Harmon Field on Guam, was a subordinate command of FEAMCOM. The 374th Troop Carrier Group, flying C-54's, accounted for approximately 7,000 hours of the total accident-free flying hours. This Unit is now assigned to the Fifth Air Force in Japan and continues to hold its fine record.

How has this goal been accomplished by the 116 pilots? Well, there are many answers to this question, and here are a few.

First, let's take the base flight section itself. Headed by recently-appointed Captain Robert C. Ogletree as Officer in Charge, it also includes Captain Everette C. Morgan as engineering officer, and 1st Lt. George L. McGinniss as officer in charge of the instrument flying board. Also included are, in the words of the pilots who fly the planes, 56 of the "best d--- mechanics in the Air Force." At present the flight section maintains two B-17's, four C-46's, eight T-6's, one C-45 and one B-26 for the pilots to fly. Though on many occasions it requires work after normal duty hours, these men have a real desire to do a good job.

Captain Morgan has maintenance crews assigned to each aircraft and each crew tries to have a better plane than the rest. This friendly competitive spirit has turned out to be a great morale factor and it is well known that the boys in the flight section, though working much longer hours, have top morale.

Cooperation is a by-word among these men; on many occasions you will see the maintenance crew of one aircraft walk over to the next plane to "pitch in" after their aircraft has taken to the air, for these men are just as interested and proud of the overall efficiency of the flight section as they are of their individual aircraft.

New airmen "fresh out" of AM School are placed alongside experienced personnel for on-the-job training, and, in addition, study and instruction periods are conducted for them. This continual training of new personnel, this friendly competitive spirit and the esprit de corps that exists among flight section personnel has "paid off" as shown by the average engine time obtained on aircraft operated by Far Eastern Air Materiel Command during the last year.

TYPE OF ENGINE	AVERAGE ENGINE TIME
R-985AN-1	911
R-134OAN-1	1151
V-1650-3	377
R-2800-75	636

1st Lt. George L. McGinniss heads the Instrument Flying Board and gives a great many of the instrument checks himself. Known as an amiable fellow at the officers' club, he is "Nobody's Friend" McGinniss on an instrument check ride and prefers to have pilots demonstrate their proficiency including radio procedures on an actual IFR flight.

Capt. Abraham G. Garcia, Flying Safety Officer for FEAMCOM, makes his meetings interesting. After taking up recent changes in policy, procedure or other flying safety measures, generally a visitor from a nearby base who is a specialist in some phase of flying is introduced and after his talk or demonstration, the program winds up in a general discussion which, often, is carried to the officers' club.

Every rated officer attends or takes part in all Flying Safety Meetings. Newcomers who are becoming adjusted to their newly-assigned "mahogany bombers" and who miss a Flying Safety Meeting soon discover they have met with a "major accident" and, as a rule, don't let it happen again. The same applies for flight schedules.

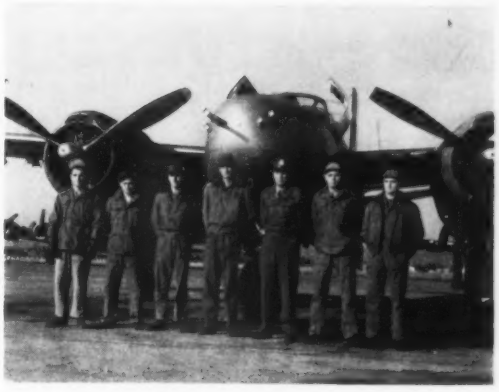
Of the 116 rated officers presently assigned, only two have flying as a primary duty. These two men, Captain James D. Kelly and 1st Lt. Farley E. Peebles, are assigned to the flight test section of the maintenance group. All others are supply officers, maintenance officers, judge advocates, personnel officers, squadron commanders, or hold down one or more of the many other varied jobs required to operate this command.

All flights, however, are not made in the local area, as one might expect. Cross-country flights to northern and southern Japan are frequent, and less often flights to Iwo Jima, Guam, Okinawa, and the Philippines. These flights are spread out to enable all pilots to maintain navigational proficiency and also to give each pilot an opportunity to see as much of the Far East as possible. All types of weather are encountered—from the heavy icing conditions sometimes found in Japan to the tropical storms in the Philippines.

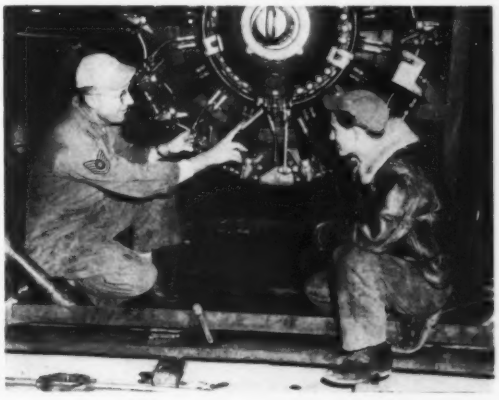
On all flights, instrument hoods are taken along and pilots work hard towards maintaining flying proficiency. Pilots use nearby Yokota Air Base for practicing GCA letdowns.

By realizing that minimum flying calls for maximum care, alertness and efficiency, pilots have utilized their flying time to great advantage over the past year and, with the help of some of the best airmen in the Air Force, have set a goal toward which all can work.

Below: Key maintenance personnel.



T/Sgt. F. S. Tomek gives Cpl. J. E. Jenkins the word on good maintenance.



MEDICAL SAFETY

YOUR sense of position, both on the ground and in the air, is governed by *vision*, which is usually reliable; *deep sensibility*, which has some reliability and formerly known as "flying by the seat of your pants," and the *inner ear*, which is not at all reliable.

Vision is the all-important sense in contact flying and it is that which you first learn. It is the loss of this vision which makes the transition from contact to instrument flight difficult, unless you learn to trust your flight instruments with the same confidence as you do the natural horizon.

The sensations provided by deep sensibility and the inner ear lead to confusion when you are flying instruments. Never trust your feel or sense of position when you are flying on instruments or at night. If you do, you will get into trouble, as the deep sensibility and the inner ear do not indicate the true position of your airplane. You may get false impressions when on instruments, even during straight and level flight and particularly in turns. Rapid or sudden tilts of the airplane, as experienced in rough air, attended by slow recoveries leave one with the impression of leaning to one side or the other. Constant checking of instruments is necessary to prevent turns away from the desired heading, which may be so slow that physically they will go unnoticed. Complete reliance on instruments is an absolute must.

You may become confused easily during night flying because your eyes deceive you. Many of the accidents in night flying are the direct result of too much reliance on the part of pilots on outside vision, rather than on instruments. At night, the inexperienced pilot may look around, attempting to find some light on the ground by which he can orient himself. Unless he is flying near a large city where there are enough lights to make a good pattern, this habit is extremely hazardous. You usually have no definite horizon at night to use as a plane of orientation—only isolated points of light.

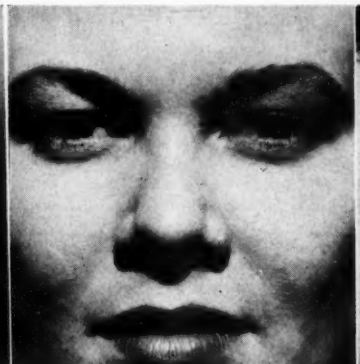
Any experienced pilot can relate how he has mistaken a star for a light beneath him which appeared to be moving past him, when actually he was turning about the star. A pilot can easily become so confused that he does not know up from down, or whether or not the airplane is turning, diving, rolling or climbing.

Most confusing and dangerous of all is the situation created when the pilot attempts to look backward to see lights behind him, such as after takeoff into unlighted territory.

Your senses may mislead you if you depend solely upon the lights on the ground for orientation, resulting in confusion and mishandling of the airplane. The only solution therefore is to know your instruments and keep a close watch on your instrument panel, with only occasional glances at the lights. The habit of using your instruments as a major reference will keep you in the Air Force.

DEEP SENSIBILITY

VISION



INNER EAR

WELL DONE

To

LT. CHESTER M. STONE and

LT. VERTNOR N. BARNETT

514th WEATHER RECONNAISSANCE SQUADRON

WEATHER Reconnaisance flights must be made on schedule, come fair weather or foul. Lt. Chester M. Stone and his B-29 Crew were assigned to fly a track from Anderson AFB, Guam, to a point 600 miles northeast of Tokyo, and thence to Yokota AFB, Japan. Flight conditions at Yokota were about as forecast: 200-foot ceiling with visibility two miles and the freezing level near the ground. Nearing the Tokyo Control Zone, Lieutenant Stone began the standard IFR letdown procedure to the Tokyo Range from which point he was to home on the Armed Forces Radio Station, WVTR, between the range station and Yokota, and be picked up by GCA.

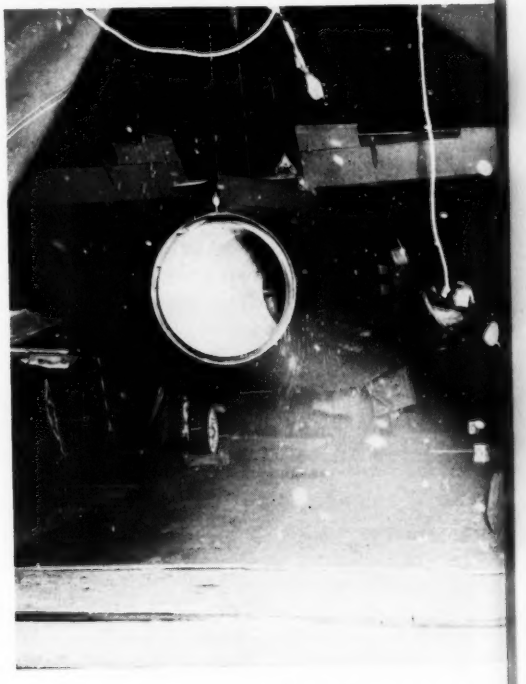
But even the best laid plans sometimes go astray as they did in this case when Tokyo Range suddenly developed a malfunction and ceased to operate, leaving the B-29 crew holding a bag of very foul weather. The radio compass had taken a holiday also, as the needle described a continuous circle around the dial, leaving no method available for homing on the broadcasting station. A speedy conference between Lieutenant Stone and Lt. Vertnor N. Barnett, the radar officer aboard, resulted in the decision to make an airborne radar approach to Yokota where GCA could then take over. This was accomplished with a safe landing.

But that's only half the story, as Lieutenant Stone and company found out on the return trip to Guam several days later. After they had passed the point of no return from Yokota, they attempted to transfer fuel from the bomb bay to the main fuel tanks. The transfer system that had been checked and found to be operating satisfactorily earlier in the flight now failed to pump fuel. About 550 gallons of highly essential 130 octane gasoline remained trapped in the bomb-bay tank, so fuel in the main tanks would have to be stretched to the limit in an effort to reach Guam, or failing that, to land at Kobler Field on Saipan, 120 miles northeast of Guam. Optimum cruise power settings were set up and the flight continued, but headwinds up to 70 knots made it apparent that an attempt to reach Guam would involve the very real danger of running out of gas. Accordingly, an attempt was made to contact Saipan so that the field and runway lights at Kobler, which normally operates only between the hours of 0700 and 1600 daily, could be turned on. It was past midnight and all efforts to make contact with Saipan operations failed, leaving no alternative but to proceed to Guam and trust in the cruise control charts.

Upon contacting Guam Control for emergency landing instructions, the pilot was told that the weather was low overcast with ceiling of 1500 feet and lower scattered scud clouds and showers. By this time, fuel gages registered empty and the crew was advised to stand by for possible ditching. With too little fuel aboard to fly a standard instrument approach on the range or a short GCA pattern, Lieutenant Barnett again came up with the answer by guiding the airplane during its instrument letdown into a position where a straight-in approach could be made. He advised Pilot Stone continuously of his distance from the end of the runway so that the latter could judge his rate of descent without overrunning the first third of the strip. At 600 feet, the B-29 was clear of the low scud clouds and two miles ahead lay the welcome sight of Andersen's 8000-foot runway, amber lights beaming.

The following morning, before the tanks had been serviced, No. 1 engine coughed and died of fuel starvation as the plane was being taxied from the ramp to its hardstand.

Skill, coolheadedness and crew cooperation averted two potential disasters.



HOT *squadron in a* COLD *climate*

By CAPT. THEODORE S. WOOD

THIS is a sort of a report. At first glance, there is nothing too startling about it. It's a report of a fighter squadron that kept something better than 23 out of 25 F-80's in commission and flying for a 10-day period. Nothing much to that. Numerous squadrons do that every once in a while and very little, if anything, is said about it. But, how about a quick double take—

The time is 13-23 February, the place the Royal Canadian Air Force Station, Whitehorse, Yukon Territory, Canada; Exercise Sweetbriar. And, mister, it's cold! Not just ordinary icebox cold, but a quiet, deceitful, boneshattering cold that will turn your nose white before you can recite "The Ballad of Yukon Jake." If you take hold of a doorknob with your bare little pinkies—and it happened a couple of times—there's another skin-covered mechanism to show the summer tourists.

Exercise Sweetbriar was a joint maneuver of Canada and the United States, designed to test standard doctrines and equipment in the most extreme temperatures available. After looking at the geography along the Alaska Highway between Whitehorse and Northway, Alaska, the planners looked no farther, for the coldest temperatures recorded are found in this craggy, rugged land where winter thermometers drop to 60 below, with far from monotonous regularity.

Assigned as part of the defensive forces of Sweetbriar, the 66th Fighter Squadron, 57th Fighter Group, Elemendorf AFB, Alaska—the outfit under discussion here—arrived at Whitehorse a couple of days ahead of schedule and began to set up. Major Taras T. Popovich, commanding officer since June 1948, was anxious to prove some of his maintenance ideas, aided by Captain John J. Voll, Squadron engineering officer. The 92.8 per cent serviceability rate speaks for Captain Voll and his engineering personnel.

Leading the Sweetbriar league in sorties flown, flying time and serviceability, took a lot of squadron spirit, hard work and a firm desire on the part of all the 66th "sourdoughs" to see a job well done. They not only got the job well done; they finished up with morale left over!

For the record, this polar-jet squadron flew 284 sorties, 353:15 hours flying time, with an in-commission rate of 92.8 per cent. There were no, repeat, no accidents. Flying time might have been boosted if the Aggressor Air Force had been over Whitehorse more often. Also, ground alerts lopped off some possible time. Seldom did the temperature during the day rise above 20 below zero, and 30 and 40 below temperatures were common. Such a record of flying safety and top maintenance under the most trying conditions of a tough winter deserve a round of applause in anybody's league.

Safety Takes Precedence—Following a delay in a flight schedule of one of the major U. S. airlines, a USAF Officer, who was a passenger, later received a letter signed by one of the airline officials explaining that the delay in the schedule was due to mechanical difficulties. Of more import was a phrase contained in the letter which makes a good slogan for every pilot to remember for every flight: "Safety Takes Precedence Over Time."

◆ ◆ ◆

Paging Pied Pipers—Speculation runs rife while rodents run rampant in the Alaskan Air Command. According to a recent report from the Alaskan Command to the Office of the Surgeon

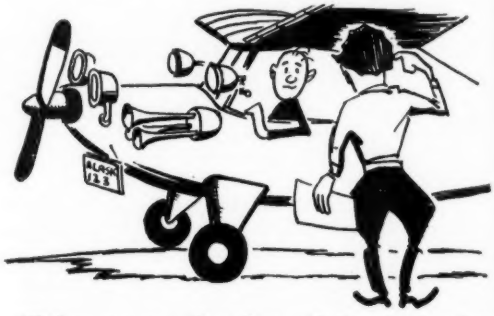
General, USAF, maintenance crews are plagued by hosts of brown rats doing serious damage at times to the insulation of wiring in aircraft. Despite a vigorous rodent control program including poisoned baits, traps, and carbon monoxide, the rats survive and the damage goes on. As a last resort, it was suggested that missions be flown at 30,000 feet for 30 minutes to kill the rats by anoxia. Taking a stand for Air Force economy, following study of the problem and suggested solution, the cautious opinion handed down was that high altitude missions would be too costly for the Air Force and prove of doubtful mortality to the rat.

Any Pied Piper MOS's?

◆ ◆ ◆

Flasher Lights for Aircraft—CAA has instructed that all aircraft operated within the ZI be installed with flasher position lights. A worldwide inventory is now being made by Air Materiel Command to determine the number of aircraft lacking flasher position light installation. Upon completion, this inventory will be used for procurement of necessary parts.

VHF/DF Runs—Not all VHF/DF operating crews get sufficient runs to maintain operational proficiency. Under the present procedure, VHF/DF is restricted to aircraft in emergencies. The exceptions to this rule are the fighter aircraft equipped with special frequency of 139.32 megacycles, which are authorized the use of VHF/DF for routine navigational homing. It has been proposed that a VHF channel be established, possibly by recrystallizing, to provide a VHF/DF training frequency. Information from Headquarters AACS indicates that a solution is being sought.



Highways vs. Airstrips—Alaskan bush pilots have been told that Alaska's highways can not be used as airstrips, except in emergencies. Highway patrolmen have received instructions to arrest any pilot using an Alaskan highway as a landing strip on charges of "operating a vehicle on highways without headlights or license plates."

◆ ◆ ◆

USAF's Flying Classroom—The USAF has recently taken delivery on the new T-29 training plane, the "flying classroom," for Air Force cadets. The T-29's are designed for training Air Force students in navigation. Externally, the plane resembles the Convair-Liner but is easily distinguished by four astrodomes on top of the fuselage and radar installations in the belly. The plane has many unusual features. Among them are a demand oxygen system sufficient to accommodate a crew of 18 for six hours at 20,000 feet. Forty-eight of the T-29's are being built for the USAF.

Trainers Packaged—The first of several T-33A Shooting Star trainers are scheduled to be delivered in special packages to their Air Force destinations. In order that they can be utilized in an advanced training program as quickly as possible, experts have packed all parts and assemblies in moisture proof crates with padding and hold-down straps to insure safe arrival. The forward fuselage and wing are sprayed as a unit with several coats of AN-C-145 compound, a rubbery, moisture-proof substance which can be peeled off. This packaging method allows quick re-assembly with minimum crews.

Tow Targets—A program for the fiscal year 1951-1952 has been established by the USAF concerning the requirements for tow targets, including the banner and 3-dimensional types. At present, the only 3-dimensional target is the Navy, Type X27A, a wing type target developed jointly by the Navy and the Air Force, but before this target can become a standard Air Force item, service tests must be run. The X27A is at present the only high speed 3-dimensional target which can attain and hold an air speed of 400 mph at extremely low temperature. Meantime, banner targets will be a continuing requirement for a minimum of five years, due to the fact that pilots and gunners will have to be taught to use the 3-dimensional target and the banner type will continue to be used in this indoctrination.

OMNI Charts—A new group of sectional charts featuring omni range stations have been drawn up for the northeastern part of the United States. The Coast and Geodetic Survey, working with the CAA, has also added reference material to the back of the charts. The new charts carry information on airport traffic patterns, instrument and visual flight rules, rescue procedures, flight plans, emergency signals, weather broadcasts, and aeronautical symbols. The new charts will replace all current sectional charts before the end of June. Omni charts now available include the following: Huntington, Norfolk, Washington, Winston-Salem, Albany, Aroostook, Boston, Burlington, Lewiston and New York.

◆ ◆ ◆

Altitude Carelessness—Approximately 85 per cent of accidents in high altitude military air operations are due to carelessness or lack of knowledge of the effects of altitude on flying personnel, according to the Air Force School of Aviation Medicine.

Better Airport Highways Sought—There is an old bugaboo of criticism made by the flying public relative to the time required to go from downtown areas to the airports. To overcome this inconvenience, a transportation specialist has been employed by the CAA Office of airports to work with a representative of the Public Roads Administration to foster and promote express highways from downtown areas to airports, which will reduce the travel time from 50 to 75%. The Public Roads Administration has offered fullest cooperation.

◆ ◆ ◆

Anticipating—Economy cuts in flying time of Air National Guardsmen will call for increased efforts to lower the ANG accident rate, according to the National Guard Association. The need for better utilization of proficiency flying time is based on cutbacks which reduce combat pilots in ANG to 110 flying hours and non-combat pilots to 80 hours annually.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

EXPERIENCE IS NOT ALWAYS THE BEST TEACHER

How many times have you asked a crew chief or aerial engineer a question and accepted his answer as gospel? If you are like most pilots, you probably can't count all of the times.

This is not written with the intention of underrating the ability and knowledge of crew chiefs at this or any other station. It is an attempt, however, to show that no matter how many years experience or service a crew chief may have, unless continuous training and refresher classes are made available to him, a dangerous situation may develop. Previously learned emergency procedures or other SOP's may have been changed or modified.

As most of the pilots assigned to this base are students and are here only for a limited time, they are unable to remain as proficient as they might otherwise be at their home stations. It is therefore considered even more important to have well informed, efficient crew chiefs on all flights.

To meet this requirement, a ground school for all flying and interested maintenance personnel was conducted, covering the following subjects:

A. Duties of Crew Chiefs
B. Instruments and Instrument Procedure.
C. Emergency Procedures
D. Navigation and Weather
E. Weight and Balance
F. Cruise Control

The classes on Instruments and Instrument Procedure, as well as Navigation and Weather, were for information, only.

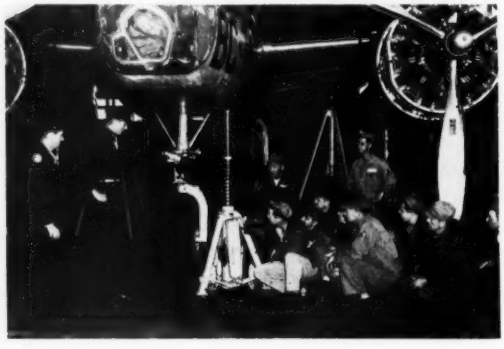
It is apparent that a crew chief who sits in the rear of an airplane, with no knowledge of what is going on during an instrument let-down, or while in weather on a routine XC flight, is going to be nervous or worried, and therefore less efficient in the event of an emergency where his services are required.

A written examination on all subjects was given at the end of the course. A minimum requirement of 100 per cent correct was required on the emergency procedure examination. Flying personnel unable to meet this requirement were afforded the opportunity of a re-examination, in order to retain their flying status.

The necessity for this refresher training was shown by the fact that approximately 20 per cent of the men examined had to take another test, although they had been crewing from three to eight years the type of aircraft on which they were examined. A large percentage of those who did pass were able to do so only because they had attended refresher classes prior to the examination.

It is believed by the officers and airmen of this squadron that refresher training of this type is essential and should be conducted at frequent intervals in all non-tactical organizations whose primary duty is not training crew members.

MAJ. JOSEPH N. DONAVAN, COMMANDING OFFICER, 3805 MAINTENANCE SQUADRON, MAXWELL AFB, ALA.



INTERIOR CHOP MARKS

United Air Lines has painted inconspicuous chop marks on the outside of its aircraft to show rescue crews safe points of entry. Chop marks inside the airplane for use of crew are also being considered, so they will hack at places most likely to facilitate escape and not cut through hydraulic or electrical lines. The natural act of trying to escape by breaking a window is impractical in pressurized aircraft. It is more practical to cut the dural around it than to smash the window!

JET TAKEOFF DISTANCE

The problem of estimating the takeoff distance for various types of jet aircraft has given much concern to the Air Force units operating them. Several jet aircraft accidents have been attributed, in part at least, to a failure to take into consideration the effect of air density, a primary factor in determining takeoff distance.

Most takeoff charts now in use by pilots and operations personnel are not adequate because the takeoff distance requirement is given as a function of temperature and runway elevation, only, omitting consideration of the effect of pressure changes at runway level. Certain existing charts attempt to take into account the effect of pressure changes by using the station pressure-altitude as an argument. Since most pilots are not familiar with the computations required to determine pressure altitude, there is a need for more efficient graphical presentation.

Air Weather Service has investigated this problem and designed a simple, easy-to-use prototype of a chart for determining the takeoff distance requirement for jet aircraft. The chart design covers the effect of temperature, field elevation, atmospheric pressure, gross weight of the aircraft, and the headwind component at takeoff. The new chart, which should eliminate the possibility of aircraft accidents due to sub-normal air densities on takeoff, has been forwarded by AWS to Headquarters, USAF for approval.

EMERGENCY CHECKLISTS

Pilots flying the overseas segment of one large airline have found a new use for telephone address books—the kind where the cover springs up to the pre-selected letter when a tab is pressed.

On the cover, in place of the index letters, they paste the list of emergencies that call for immediate action but require a checklist to be certain that no step is overlooked. For example:

(Emergency) Engine overspeed
Propeller feathering, unfeathering
Emergency Descent
Explosive Decompression

On the inside pages of the index, in the place where formerly a lonely pilot could seek solace in telephone numbers, are pasted the procedures in abbreviated form. When an emergency occurs a quick and simple operation produces the desired checklist. Press the tab, and there is the procedure. The pilots carry this simple gadget with them at all times.

NEW GCA PROCEDURES

Mitchell Air Force Base, New York, has come up with a new type of ground controlled approach aimed at speeding up arrivals and attempting to cut down on former long range patterns.

An inbound aircraft is contacted over an outer check point and instructed to let down to an assigned holding altitude on the Mitchel Range. Upon arriving over the station the aircraft immediately starts a standard race track pattern. While holding, the pilot is informed that he will be instructed to descend to initial altitude and that subsequently he will be instructed to let down and land from the holding pattern. On an outbound heading, final cockpit check will be completed, gear down and locked. Upon turning inbound, the pilot is informed that he is on final approach and is turned over to his final controller. Letdown and landing from here on in is normal, with the additional aid of an ADF station located just beyond the approach lights and a marker beacon off the end of the runway.

Missed approach involves flight to another holding pattern and subsequent return to the Mitchel holding stack.

With the advent of this type of approach, the possibility of GCA losing you on base leg is very remote and the time interval for each GCA run has been appreciably reduced.

A number of actual instrument ground controlled approaches have been accomplished using this system and have resulted in considerable praise for the Mitchel GCA team.

CAPT. PAUL W. ECKLEY

WHO SAYS WHAT TO WHOM?

INACCURATE position reporting results in many unnecessary violations being filed by Air Route Traffic Control Centers. The control center receiving a position report can only assume that the pilot is where he says he is. This can be illustrated by a recent incident. An Air Force plane en route to March AFB was instructed to cruise at 10,000 feet from Bakersfield to Wheeler Ridge. Wheeler Ridge is the intersection of Amber One and Blue 14 airways. After reaching Wheeler Ridge, the airplane was instructed to cruise at 12,000 feet from Wheeler Ridge to Palmdale. The copilot made a position report as follows: "Over Wheeler Ridge 0905 climbing to 12,000." Asked to verify altitude, he reported that he was at 11,500, which was the altitude he read off the altimeter during the climb to 12,000.

ARTC assumed, naturally enough, from the copilot's report that the airplane was continuing at 11,500 feet instead of its assigned altitude of 12,000. Later, in the flight over Palmdale, the Air Force plane was asked for a top report. The plane was flying at its assigned altitude of 12,000 feet between layers and the copilot estimated the top of the layer above him to be 13,500 feet. This gave ARTC the impression that the Air Force plane was flying above its assigned altitude.

An investigation was made of the incident and the flight was cleared of violation charges. The flight from Bakersfield to Wheeler Ridge was conducted according to instructions received and was made at an altitude of 10,000 feet. After reaching Wheeler Ridge, the airplane was turned on course to Palmdale and the climb to 12,000 feet commenced.

Improper radio procedure by the copilot, who was monitoring VHF Channel A and making the position reports, resulted in an erroneous report of 11,500 feet, which actually was the altitude at the time of the report during the climb to 12,000 feet.

Airplane commanders should assure themselves that copilots are thoroughly briefed on proper position reporting, prior to assigning them the duty. This copilot was given a period of instruction in the Link trainer. His special course consisted of receiving, copying, reading back, and complying with ARTC clearances.

Many snarls in air traffic and subsequent violation reports can be avoided by more conscientious navigation and position reporting by USAF pilots.

FLYING SAFETY

DEPARTMENT OF THE AIR FORCE

THE INSPECTOR GENERAL, USAF
DIRECTORATE OF FLIGHT SAFETY RESEARCH
Norton Air Force Base
San Bernardino, California
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Volume 6 No. 5 **May 1950**

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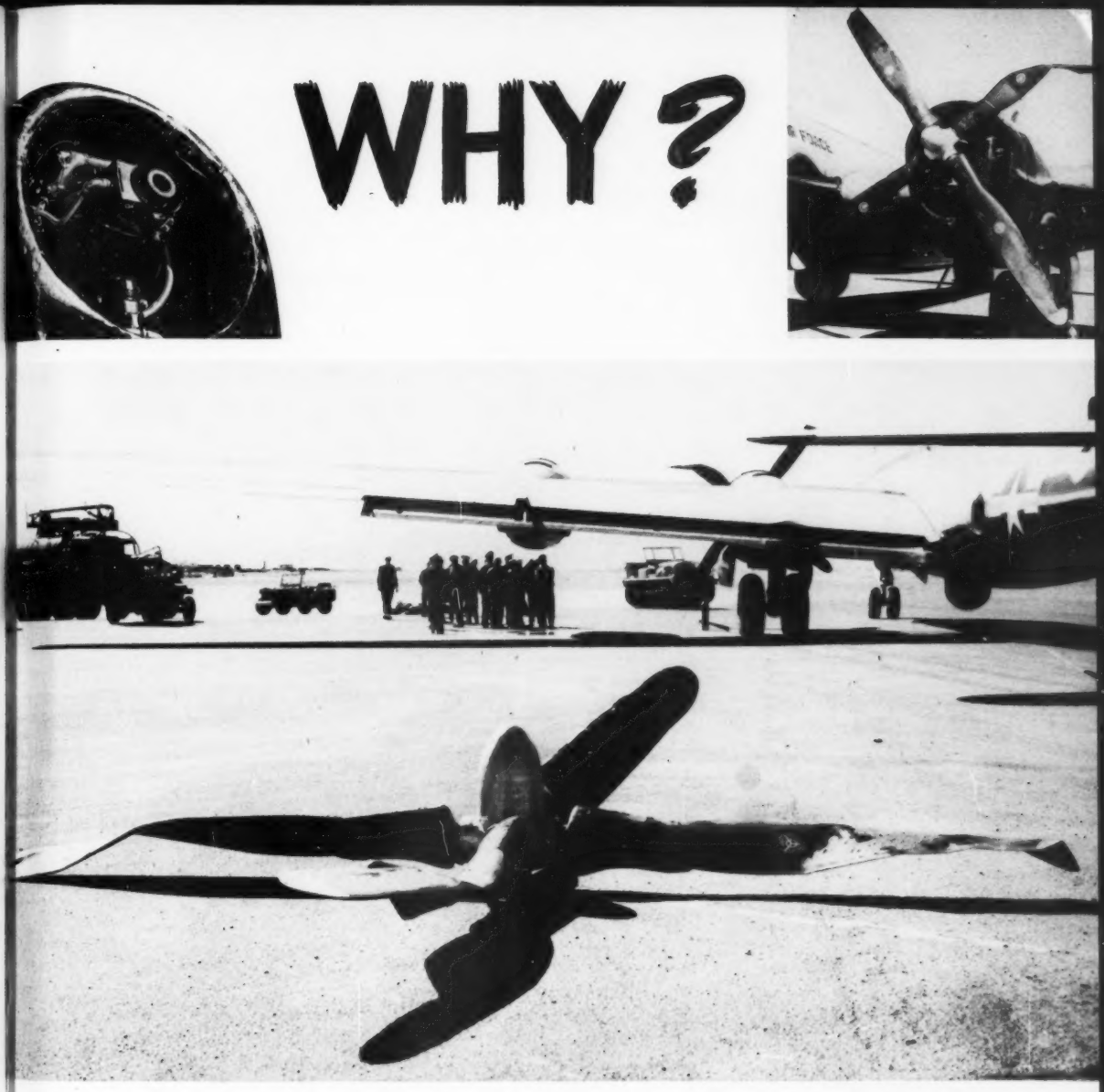
WHY?

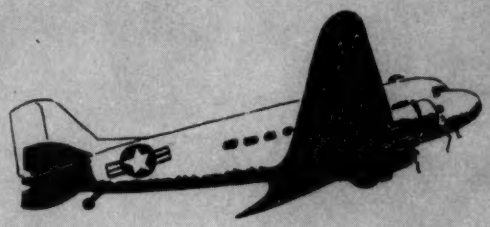


DURING the takeoff roll, with power settings of 2800 rpm and 48 inches Hg manifold pressure, the No. 1 engine on a B-29 oversped to 3000 rpm and manifold pressure surged to 62 inches. Before the bomber became airborne, the No. 1 propeller broke off at the shaft, flew into No. 2 propeller, then hit the fuselage causing extensive damage.

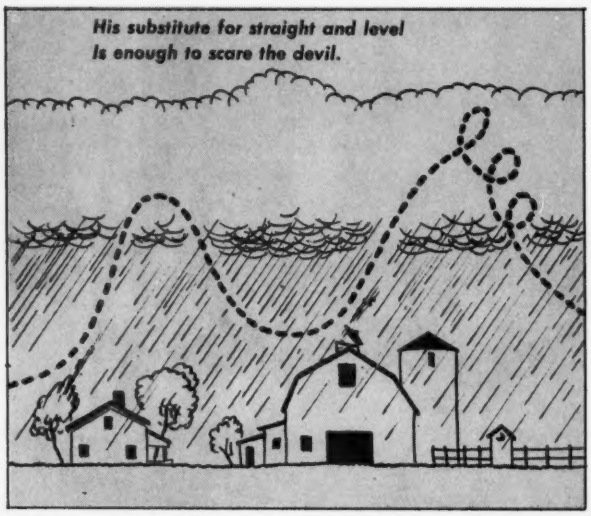
Investigation revealed excessive loss of oil had occurred through the waste gate of the No. 1 engine turbo, although oil pressure gages read normal prior to the malfunction. The propeller alternator assembly was inspected and no discrepancy was disclosed.

What caused the trouble was that maintenance personnel failed to press the 7C5 tube into the locked position when they installed the amplifier on No. 1 turbo control. Vibration caused the tube to work loose, so that the amplifier became inoperative on the open side. When power was applied the waste gate went to the closed position, resulting in a runaway turbo and excessive manifold pressure which caused the propeller to overspeed.

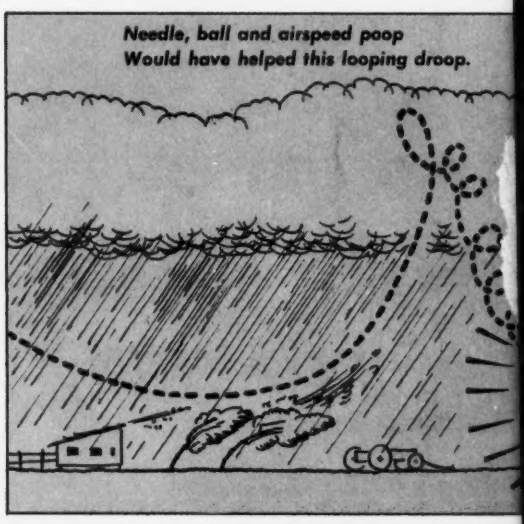
Mal Function



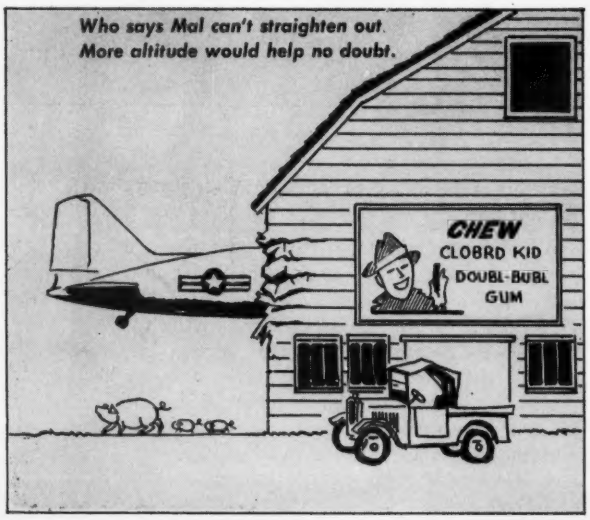
Wild grey yonder, on the gages,
Mal has gyros still in cages.



His substitute for straight and level
Is enough to scare the devil.



Needle, ball and airspeed poop
Would have helped this looping droop.



Who says Mal can't straighten out.
More altitude would help no doubt.

For treatment cage has been transferred
To help the birdbrains learn the word.

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